

**Seminar on Physics and Chemistry
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Remote sensing of greenhouse gases from ground and space

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Abstract

Man-made emissions of the greenhouse gases carbon dioxide and methane are the main forcings for contemporary climate change. On top of the direct anthropogenic emissions, the processes of the carbon cycle are of key relevance since it is these processes that regulate the gas abundances in the atmosphere on intra-day to millennial timescales. The response of the carbon cycle to climatic, meteorological, and human forcing is a highly uncertain feedback mechanisms when it comes to projecting future climate scenarios.

We develop innovative techniques that aim at better quantifying anthropogenic emissions and better understanding the carbon cycle processes. In particular, we have developed a mobile ground-based observatory that can be deployed on platforms such as ships and cars. I will report on recent field campaigns targeting at localized emission sources such as the Mt. Etna volcano and the coal mines in the Upper Silesian Coal Basin. For satellite platforms, we have elaborated on a geostationary observing concept with the particular goal to sample the African carbon cycle. And, I will shortly report on first results from TROPOMI's methane measurements.